Elevated blood 5-HT levels have been reported in psychosis in a number of studies (Garelis *et al*, 1975; DeLisi *et al*, 1981; Stahl *et al*, 1983). Blood 5-HT levels tend to increase in the premenstrual period in normal women (Rapkin *et al*, 1987). Increased 5-HT levels in the premenstrual period may therefore contribute to the relapsing of the psychosis, especially the negative symptoms.

There is also evidence for the serotoninergic modulation of blinking in animal experiments (Dursun & Handley, 1991) The $5\text{-HT}_2/5\text{-HT}_{1C}$ receptor antagonist ritanserin abolished blinking induced by intracerebroventricular injection of thryotropin-releasing hormone, whereas haloperidol did not (Dursun & Handley, 1991). This experimental data also supports Dr Lovestone's observation about the inactivity of adequate dosage of dopamine antagonists to antagonise blinking.

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Syndromes of schizophrenia on factor analysis

Sir: Several studies in recent years have investigated the grouping of schizophrenic symptoms by factor and cluster analyses (Liddle, 1987; Mortimer *et al*, 1990; Liddle & Barnes, 1990; Peralta *et al*, 1992). The use of these techniques is a welcome trend. Published studies reveal two main applications: (a) elucidation of the factorial structure of clinical rating scales in which all the items are analysed; and (b) determination of symptom clusters in schizophrenia where the choice of items is determined by investigators. However, there are several limitations to the use of factor analysis for interpretation of findings and classifying syndromes, some of which we wish to highlight.

Firstly, the choice of sample is important. Schizophrenic in-patients differ from matched controls in the community on several parameters, especially the types and severity of symptoms and indices of deterioration (Soni *et al*, 1992). Factor analysis on such patients will produce results biased towards chronic residual psychopathology. If the in-patient sample is then further selected on the basis of severity of symptoms, only the most deteriorated patients would be included in the data analysis. Symptoms seen during acute exacerbation of schizophrenic illness often differ from those seen during remission; to our knowledge this has not been systematically investigated. Besides, symptoms during the earlier years of illness differ from those seen in older schizophrenics, presumably due to changes related to ageing and other factors. All these factors could affect the outcome of factor analysis.

Secondly, the choice of variables must be considered carefully. The initial correlation matrix and reliability analysis are useful tools for choosing variables on the basis of simplicity and parsimony. It is interesting that most factor analyses have been unable to elicit an affective syndrome, although clinical experience in the community suggests that schizophrenic patients with clinically significant depression or anxiety are far from rare. The choice of clinical rating scales is equally important and a recent study (Peralta *et al*, 1992) reported three syndromes of acute schizophrenia using SANS and SAPS, both of which exclude affective items.

Thirdly, factor analysis, like several other multivariate statistical procedures, requires rigid control of distribution characteristics of variables. Uncritical acceptance of minimum eigenvalues for the number of factors to be resolved (which in most statistical packages is one by default) may confound the factor structure and composition. It must be remembered that factor analysis tries to group variables into meaningful factors which reflect certain underlying constructs. The different factors should in no way be construed as being independent syndromes unless supported by associated data; all that can be said about the factors is that certain symptoms 'run together' in clinical practice. This is clearly indicated by a scrutiny of the factor coefficients, which invariably reveal considerable overlap.

It is clear that great caution is necessary in using factor analysis and in interpreting its results in clinical practice. Researchers should document and report the various characteristics of samples so that their results can be compared with other reports. It should not be assumed that syndromes elicited by factor analysis are necessarily independent; in most cases there is considerable overlap. Finally, it is

important that once factors have been developed, confirmatory data should be presented to validate the findings.

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SIR: Peralta *et al* (*Journal*, September 1992, **161**, 335–343) contribute to the developing consensus that factor analysis of schizophrenic symptoms yields at least three factors, consistent with the three-syndrome model (Liddle, 1987), but they conclude that a valid classification of symptoms has yet to be achieved. The evidence from a decade of scrutiny of the relationships between schizophrenic symptoms stimulated by Crow's concepts of type 1 and type 2 schizophrenia suggests that it is irrelevant to seek a classification such that each symptom belongs to a unique syndrome. The syndromes of schizophrenia are not discrete types of illness, but rather, groups of symptoms that coexist with each other more frequently than with those from other groups. Thus the symptoms of schizophrenia form a constellation of syndromes, all of which are related, but some of the relationships are closer than others.

The relationships revealed by factor analysis depend on the range of phenomena embraced by individual items and by the range of items entered into the analysis. Different choice of symptom rating scales will lead to emphasis on different aspects of the relationships between symptoms. This was demonstrated in my original study (Liddle, 1987), in which I analysed two different sets of symptom scores. The analysis of PSE scores produced a four-factor solution in which two factors reflected reality distortion. Delusions and hallucinations segregated into paranoic and Schneiderian groups. Some analyses will emphasise relationships that cross the boundaries within the three-syndrome model. For example, the relationship between formal thought disorder and some types of delusions is quite strong, so if the symptom rating scale combines all delusions into a single score (as in the Krawiecka scale), there will be overlap between items loading on the factors representing the disorganisation and reality distortion syndromes, as was found by Liddle & Barnes (1990).

Insofar as relationships between symptoms reflect relationships in the pathophysiological processes that generate the symptoms (rather than mere artefacts of measurement procedure), examination of the pattern of relationships between symptoms might yield useful insights into the underlying pathophysiology. The three-syndrome model led me to propose three specific cerebral sites for the abnormalities associated with the three syndromes. These specific predictions were confirmed in a study of regional cerebral blood flow (Liddle *et al*, 1992). Furthermore, in accord with expectation, the specified sites were part of three overlapping patterns of disturbed function in multimodal association cortex. An analysis of the data using canonical correlation demonstrated the areas of overlap between the different syndromes (Friston *et al*, 1992). In particular, the left medial temporal lobe was implicated in all three syndromes. Thus, despite the clinical heterogeneity of schizophrenia, contemporary evidence reinforces Kraepelin's amalgamation of catatonia, hebephrenia and dementia paranoides to form a single disease.

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Propofol and ECT

SIR: We have been following with interest the recent correspondence in the *Journal* concerning the role of propofol in anaesthesia for ECT (Pippard, 1992; Haddad & Benbow, 1992). Both Dr Pippard and Drs Haddad and Benbow warn against the use of propofol on the grounds that the well-demonstrated